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BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE CHATTOOGA, TALLULAH, AND OCONEE RANGER DISTRICTS (CHATTAHOOCHEE-OCONEE NATIONAL FOREST, GEORGIA)

by

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ABSTRACT

Aerial surveys and ground checks of 568,242 acres including 314,414 acres of host type showed 96 southern pine beetle spots (0.30 spots per 1000 acres of host) on the Chattooga, Tallulah, and Oconee Ranger Districts. Overall, activity has dropped dramatically since the spring of 1980.

INTRODUCTION

In years past, the Chattahoochee-Oconee National Forest has been the scene of several southern pine beetle outbreaks. The Chattooga and Tallulah Districts, located in the northeastern corner of Georgia, experienced moderate to low losses between August 1968 and March 1972. The summer of 1972 populations exploded on both Districts with 112 infested trees per 1000 acres of host reported at year's end on the Tallulah District. Populations then declined the following year. The last evaluation, made in April 1980, showed only 4.2 and 3.0 trees per 1000 acres on the Chattooga and Tallulah Districts, respectively (figure 1).

Figure 2 illustrates population trends on the Oconee District (north-central Georgia) measured at irregular intervals between September 1964 and April 1980. From 1964-71 populations were relatively low with less than 20 infested trees per 1000 acres of host. In the spring of 1979, populations exploded. An evaluation made in April 1980 showed a massive population buildup with 344 infested trees per 1000 acres of host.

SOUTHEASTERN AREA, STATE & PRIVATE FORESTRY
USDA FOREST SERVICE, ATLANTA, GA 30309

FIGURE 1. SEVERITY OF SPB ATTACK ON CHATTOOGA AND TALLULAH RANGER DISTRICTS 8/68–4/80

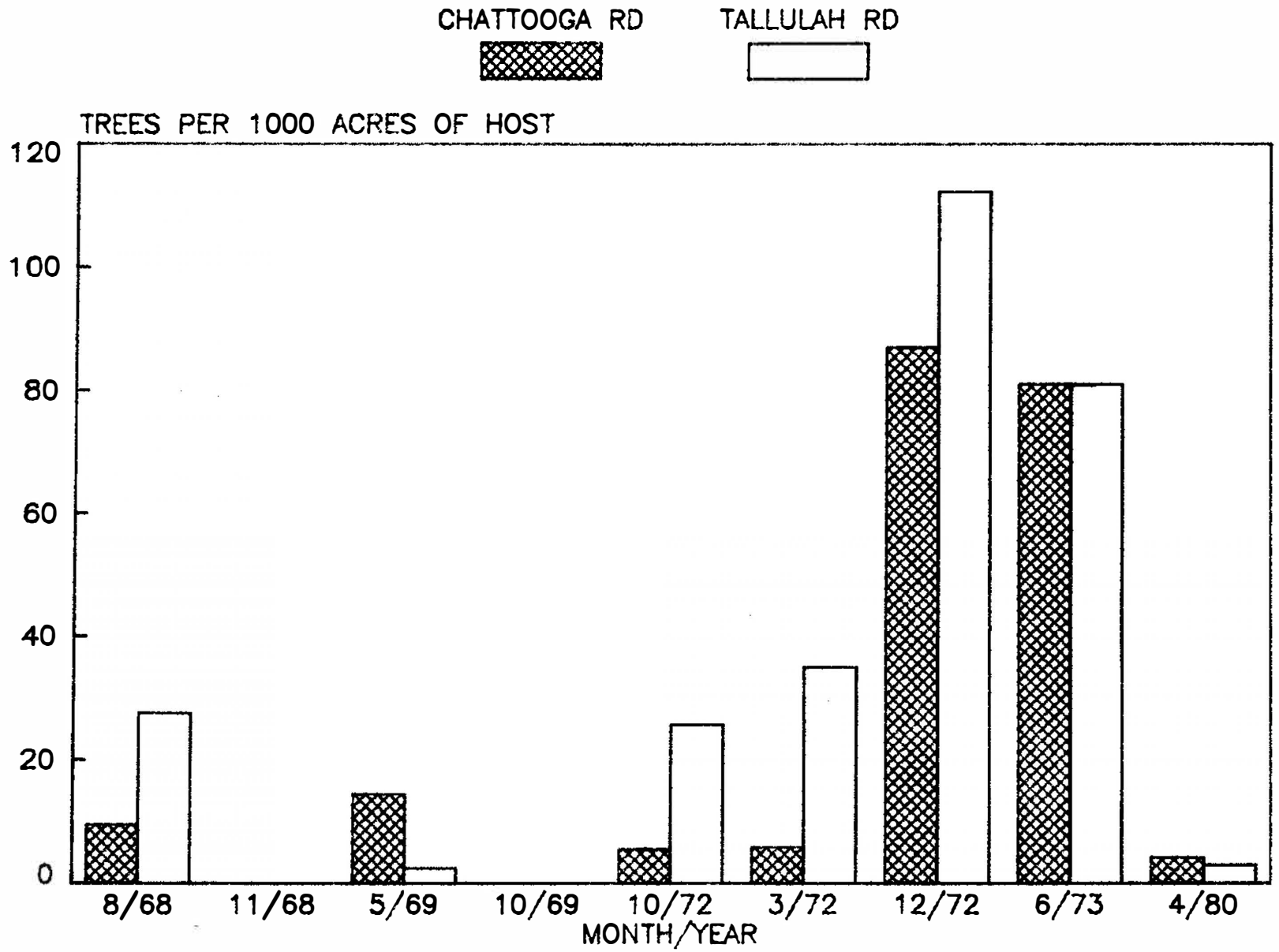
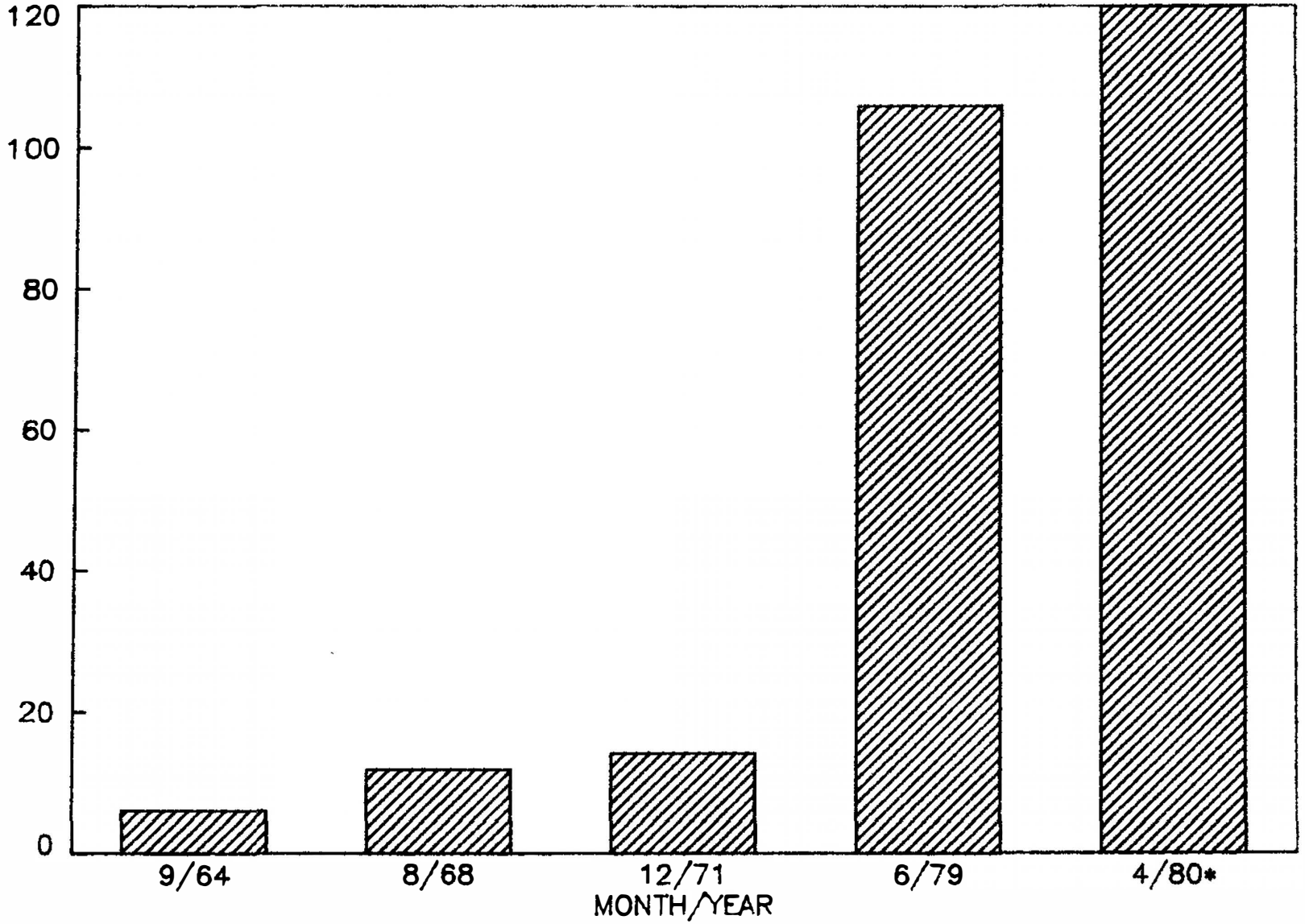


FIGURE 2. SEVERITY OF SPB ATTACK ON OCONEE RANGER DISTRICT 9/64–4/80



*343.5 TREES IN MAY OF 1980

In September 1980, another evaluation was made on these three Districts to determine the status and trend of beetle populations and possible need for suppressive measures.

METHODS

Aerial sketch map surveys were made by District personnel on all three Districts. Areas of dead and dying pine were marked on standard Class "A" Forest Service maps. Spots were stratified by size class and random spot selections for ground checking were made proportionate to size class distributions.

Data collected at each infestation included the number of currently infested trees by color class, volume data, and basal area data. The information was then compiled by District and totaled.

RESULTS

Table 1 shows acres surveyed, number of spots found on the aerial survey, spots per 1000 acres of host and estimated volume infested for each District.

Table 2 shows spots distribution by District and by size class category.

Results of the ground surveys are shown in Table 3.

The following is a synopsis by Ranger Districts:

Chattooga: Activity is light on the Chattooga. As has traditionally been the case, infestations are concentrated in the southern section of the District, just north of the Banks County line (figure 3). Two spots were found to be inactive. Eight of the fourteen spots were in the smallest size class (1-10 trees).

Tallulah: Because of the small number of spots on the Tallulah Ranger District, all were ground checked. All four were small but active spots.

Oconee: Activity on the Oconee has declined tremendously since the early spring. Despite a massive and credible salvage program by the District, much timber remains to be cut. Nevertheless, ground checks throughout the District showed that the number of currently infested trees is relatively low. Five of eleven aerially-

Table 1.--Results of aerial surveys and estimated severity of current southern pine beetle infestations by District.

District	Total acres surveyed	Susceptible Acres	Total Spots	Spots/1000 ac host	MBF currently infested
Chattooga	214,859	108,831	14	0.13	14.3
Tallulah	248,383	121,583	4	0.04	3.8
Oconee	105,000	84,000	78	0.86	42.0
Total	568,242	314,414	96	0.30	60.1

Table 2.--Distribution of spots by size class category 1/ on Chattooga, Tallulah, and Oconee Districts.

	spot size category (trees)					
District	1-10	11-25	26-50	51-100	100+	Total
Chattooga	8	4	1	1	0	14
Tallulah	4	0	0	0	0	4
Oconee	27	35	7	3	6	78
Total	39	39	8	4	6	96

1/ from aerial survey

Table 3.--Ground check information fr Chattooga (1a-10a), Tallulah (1b-4b) and Oconee :-11c) Ranger Districts

Spot.No.	Aerial size	Vacated Recent	Vacated Total	Infested RI	Infested GI	Infested Total	% INF	Green: Red	Basal Area	DBH/Height
1a	1	0	0	2	0	2	100	-	100	13.9/87
2a	1	0	01	1	0	1	100	-	180	17.0/70
3a	5	0	0	2	4	6	100	1·0.5	120	11.8/57
4a	5	4	4	0	3	3	60	1:1.3	190	9.5/60
5a	15	6	6	8	7	15	71	1:2	150	10.2/59
6a	Inactive									
7a	30	34	34	1	0	1	3	-	120	11.1/60
8a	Inactive									
9a	50	27	27	7	32	39	59	1:07	140	9.9/61
10a	90	81	102	17	22	39	33	1:44	140	10/58
1b	2	1	0	1	0	1	100	1:1	140	10.0/62
2b	2	1	0	1	6	7	100	1:0.1	170	12.7/55
3b	3	1	0	4	0	5	80	-	140	10.9/52
4b	5	0	5	0	6	6	54	1:0.9	100	8.0/38
1c	8	3	3	5	0	5	62	-	140	9.6/54
2c	5	11	11	0	1	1	8	1:11	120	10.9/62
3c	10	42	42	5	0	5	11	-	80	11.3/57
4c	Inactive									
5c	20	24	24	6	6	12	33	1:5	210	9.4/51

Table 3.--(cont)Ground check information om Chattooga (1a-10a), Tallulah (1b-4b) and Ocon (1c-11c) Ranger Districts.

Spot No.	Aerial size	Vacated		Infested			% INF	Green: Red	Basal Area	DBH/Height
		Recent	Total	RI	CI	Total				
6c	15	23	23	1	0	1	4	-	140	12.6/67
7c	14	8	8	6	0	6	43	-	120	8.8/49
8c	15	25	25	2	0	2	7	-	120	10.8/57
9c	40	38	50	0	36	36	49	1:1	110	10.7/61
10c	74	75	85	0	4	4	5	1:19	110	11.9/60
11c	101	60	80	0	52	52	46	1:1	120	10.7/61

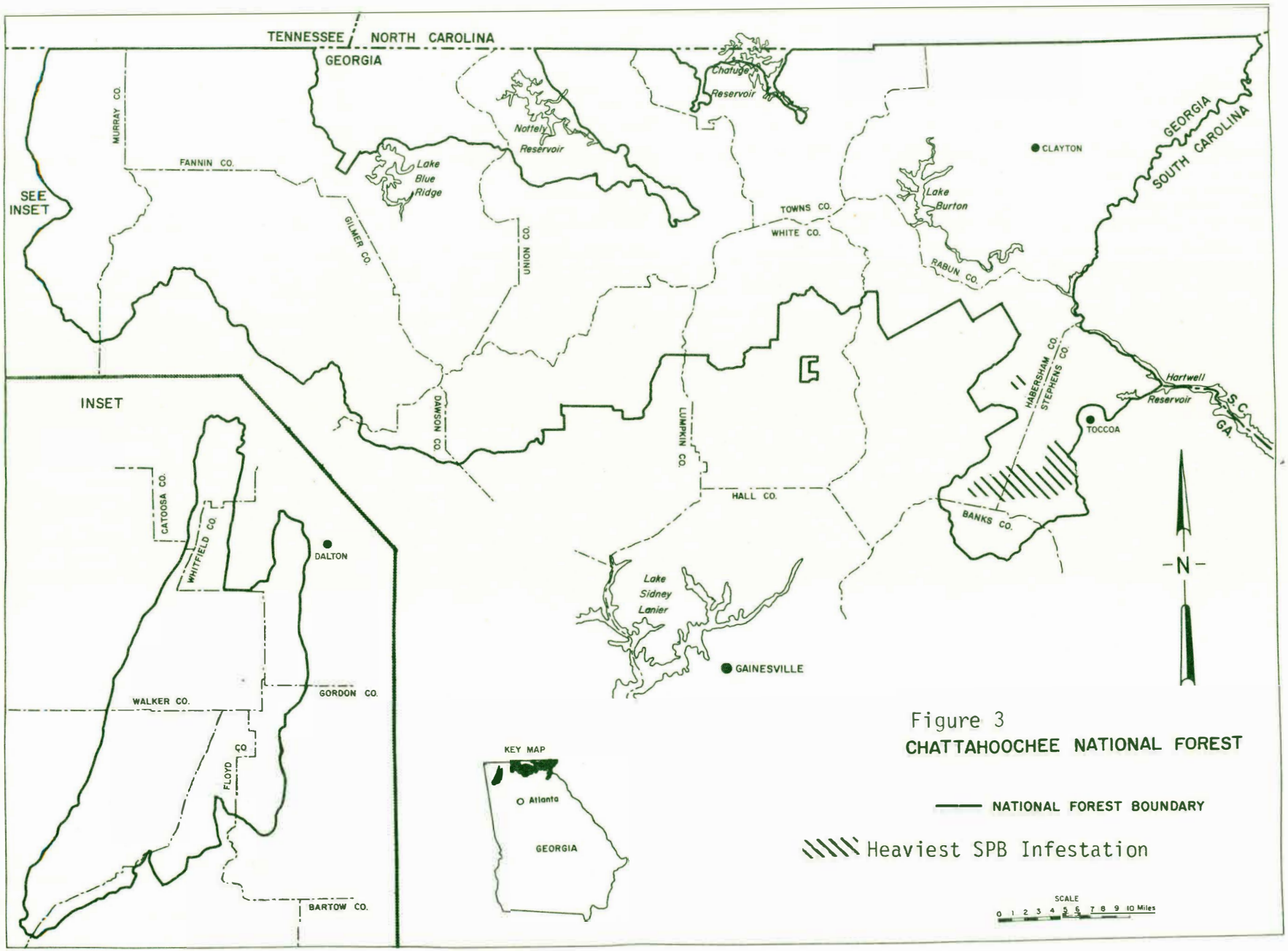


Figure 3
CHATTAHOOCHEE NATIONAL FOREST

detected spots contained no green infested trees and one of these was totally inactive. Brood beetle condition in several of these infested spots appeared poor. Areas of heaviest activity are shown in Figure 4.

In general summary, beetle activity is low or significantly declining throughout the three infested Districts in Georgia. Nevertheless, the spring and summer of 1980 have been among the driest on record, and such drought can predispose trees to attack. Despite the encouraging data gathered in these evaluations, the potential for a resurgence of beetle activity in 1981 is high. Forest Pest Management and District personnel should be cognizant of this threat, and should carefully monitor beetle activity next spring and summer.

In those areas where the beetle continues to kill timber, several direct and indirect controls can be used.

CURRENT DIRECT SUPPRESSION RECOMMENDATIONS

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

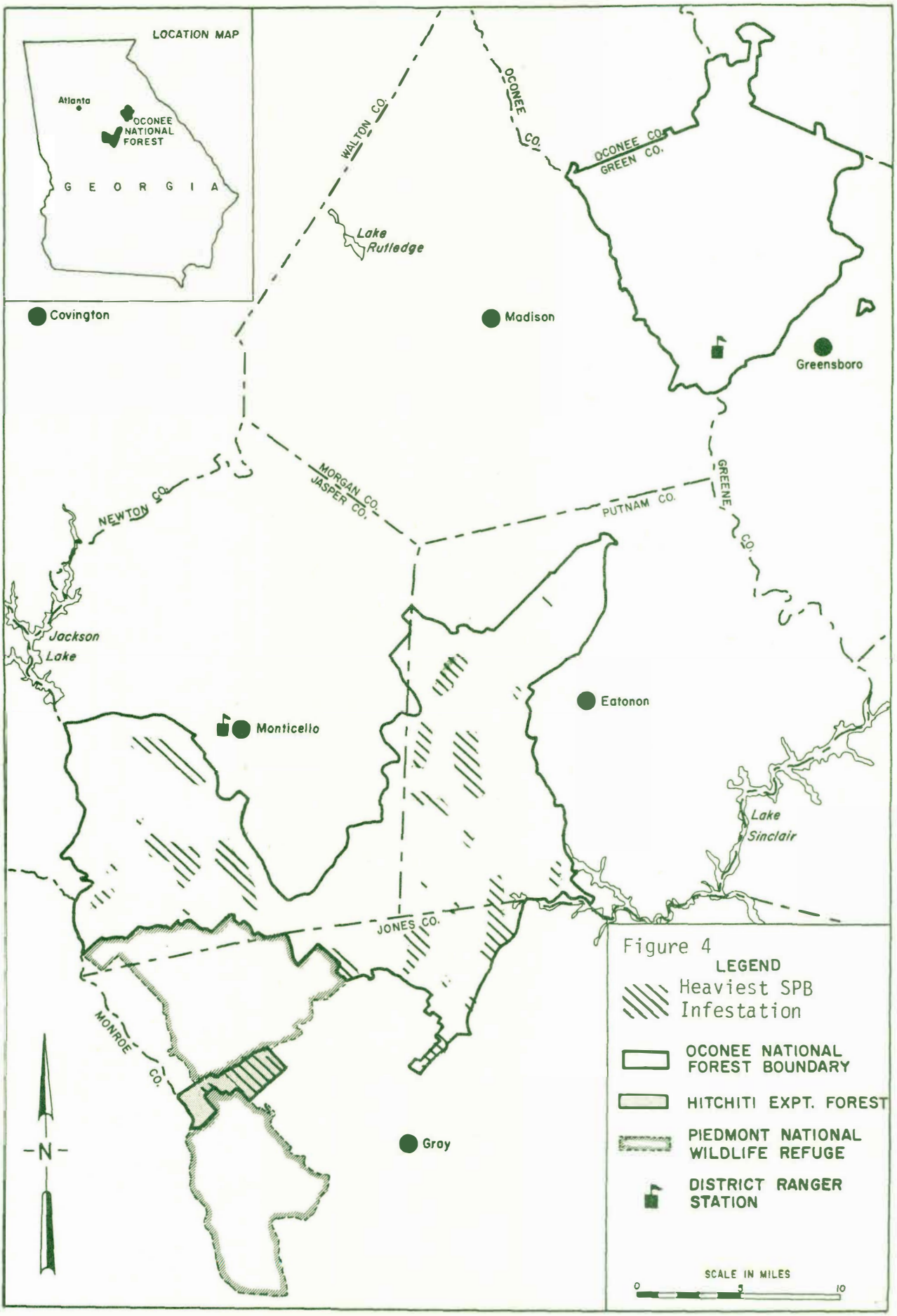
   When practical, and if host type and fresh attacks are present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts." When only a small volume of infested merchantable material occurs in a spot, noninfested trees surrounding the spot may be marked to provide an operable cut.

   The order of priority of removing beetle-infested timber from a spot with fresh attacks should be as follows:

   -- Trees in the buffer zone at the head(s) of the spot - if not removed within 2 weeks of marking, another visit and talley must be made in order to insure removal of all infested trees and an adequate buffer strip.

   -- Trees with fresh attacks and having young broods (usually the green, recently infested trees).

   -- Trees having nearly developed broods (usually the red and fading trees).


LOCATION MAP
Atlanta
OCONEE NATIONAL FOREST
G E O R G I A
WALTON CO.
OCONEE CO.
OCONEE CO.
GREEN CO.
Lake Rutledge
Covington
Madison
Greensboro
NEWTON CO.
MORGAN CO.
JASPER CO.
PUTNAM CO.
GREENE CO.
Jackson Lake
Monticello
Eatonon
Lake Sinclair
JONES CO.
MONROE CO.
Gray
N
Figure 4
LEGEND
Heaviest SPB Infestation
OCONEE NATIONAL FOREST BOUNDARY
HITCHITI EXPT. FOREST
PIEDMONT NATIONAL WILDLIFE REFUGE
DISTRICT RANGER STATION
SCALE IN MILES
0
5
10

-- Older, nonsalvagable vacated material should be left to let parasites and predators emerge and provide foraging and potential nest trees for some woodpecker species.

Remove infested trees from National Forest lands by commercial sale or administrative procedures in accordance with guidelines and procedures set forth in FSM 2400 through 2490.

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure effective control. The side order of priority for cutting, piling, and burning infested trees, particularly the large spots, is the same as paragraph (1) under "Removal of Infested Trees by Commercial Sale or Administrative Use." Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts," every effort should be made to locate and treat all green infested trees during the piling and burning operation.

3. Chemical Control. The chemical formulation recommended for southern pine beetle control is a 1 percent lindane spray with water as the carrier. This may be formulated from a 20 percent lindane emulsifiable concentrate at the rate of 11 pints of concentrate in enough water to make 55 gallons of spray. (Ratio of one part 20 percent lindane EC to 39 parts water.)

Dursban® (chlorpyrifos) is also registered for southern pine beetle control. It is available as a liquid containing 4 pounds of insecticide per gallon of concentrate. The spray is prepared by mixing 2 2/3 fluid ounces of concentrate with water to make 1 gallon or 2.1 gallons of concentrate in 100 gallons of water. Dursban® is to be applied only by or under the supervision of a certified pest control operator or other trained personnel responsible for insect control programs.

Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of runoff. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three times to insure complete treatment of infested bark. Low pressure sprayers may be used to treat large accessible infestations.

The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under "Removal of Infested Trees by Commercial Sale or Administrative Use." Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts," every effort should be made to locate and treat all green infested trees during the chemical control operation.

Never spray trees from which southern pine beetle brood has emerged. Natural enemies of the southern pine beetle in these trees can then complete their development.

Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in Section 8.3 of the Forest Service Health and Safety Code FSM 5242.21.

4. Cut-and-leave. This control tactic reduced losses from spot growth and proliferation during the summer months. Cut-and-leave is designed to disrupt spot growth in small to medium-sized spots (10-40 active trees) by dispersing emerging beeltes. These spots can be salvaged when markets or weather permit. Trees are still suitable for sale months after felling.

The following procedure is to be followed when using cut-and-leave:

(1) Identify all active trees within the spot.

(2) Fell all trees toward the center of the spot.

(3) Fell a horseshoe-shaped buffer of green, uninfested trees around the most recently attacked trees at the head of the spot and leave them lying on the ground with crowns pointed toward the center of the spot. The buffer should be as wide as the average height of the trees in the stand.

Cut-and-leave treatments should only be applied during the summer months between June and October. Spots with 10 or more infested trees should be treated first. As time permits, spots with less than 10 infested trees should also be treated if they contain trees with fresh attacks. In these smaller infestations where a specific head is not distinguishable, an adequate buffer strip (equivalent to the average height of the stand) and all infested and green uninfested trees within the spot should be felled.

SETTING SPOT TREATMENT PRIORITIES

Based on spot viability, stand stress factors, and economics, Billings and Pase (1979) developed a simple system for assigning spot treatment priorities. The system is summarized in the following table. Stage 1 trees are freshly attacked. Stage II trees are ones containing developing southern pine beetle brood.

Table 2.--Guide to southern pine beetle spot growth and control priorities (May through October)

Key to spot growth	Your spot's classification	Risk-rating points
A. Stage 1 trees	absent	0
	present	30
B. Stage 1 and 2 trees	1-10	0
	11-20	10
	21-50	20
	more than 50	40
C. Pine basal area (ft^2/Ac) (or stand density) at active head or heads	less than 80 (low density)	0
	80-120 (medium density)	10
	more than 120 (high density)	20
D. Stand class by average d.b.h. (in inches)	pulpwood (9 in. or less)	0
	sawtimber (more than 9 in.)	10
	Total'	

'If total is 70-100 control priority is high. If total is 40-60 control priority is Medium. If total is 0-30 control priority is Low.

Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated or cut and left within 2 or 3 weeks after treatment to check for additional infested trees. If additional trees are found, and if priorities permit, treat them (see "Setting Spot Treatment Priorities.")

In any area where infested trees are cut for chemical control, piling and burning, cut-and-leave or removed through commercial sales and administrative use procedures, stumps adjacent to living pine trees should be treated to control or prevent the root rot Fomes annosus (a disease which can aggravate southern pine beetle problems).

Stands that have been previously thinned or have had a history of F. annosus infection, stumps should be treated with the competing fungus, Peniophora gigantea.

Stands that have no history of F. annosus and have never been thinned the stumps should be treated with borax.

Southern pine beetle infested tree stumps cut during the period of May through August, and below 34° N. latitude do not have to be treated with either of the above materials. This is because few spores are formed during this period and high temperatures often kill spores that are produced. However, routine summer thinning in areas of southern pine beetle buildup is not recommended.

PREVENTIVE MEASURES

The preceeding represents only short-term, immediate control strategies. Preventive measures must be taken to help ward off further southern pine beetle infestations in noninfested stands. Some of the more significant preventive measures include:

1. Preventing or minimizing littleleaf disease, a condition associated with beetle attack. Research has shown a relationship between southern pine beetle infestations and areas designated as "littleleaf sites." Depending on severity of infection, diseased trees may be removed during normal thinnings, on a 6-year cutting cycle or as soon as merchantable. In high-hazard areas or in replanting known littleleaf sites, use loblolly pine or a more resistant tree species, as opposed to shortleaf pine.

2. Harvesting mature and overmature stands. Such stands are vulnerable to beetle attack and should be harvested as soon as possible.

3. Thinning stagnated stands. Overstocked stands are low in vigor and are more likely to be attacked. They should be thinned to a point that trees again show thrift and vigor.

4. Minimizing impact of natural disturbances which causes stand stress. These factors include ice, wind, hail, and animal damage, flooding, erosion, poor soil fertility, lightning, etc. Corrective measures include removal of individually damaged trees, wholesale salvage, improving drainage, fertilization, etc.

5. Minimizing or eliminating man-caused disturbances. Logging, pipeline, sewerline, and powerline construction, and other construction activities require use of heavy equipment which causes tree skinning and soil compaction and significantly weakens trees. Efforts to minimize the damaging consequences of these activities can significantly reduce the possibility of their leading to southern pine beetle problems.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of reach of children and animals--away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you used for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary landfill dump, or crush and bury them in a level isolated place.

NOTE: Some states have restrictions on the use of certain pesticides. Check your state and local regulations. Also, because registration of pesticides are under constant review by the U. S. Department of Agriculture, consult your county agricultural agent or state extension specialist to be sure the intended use is still registered.

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